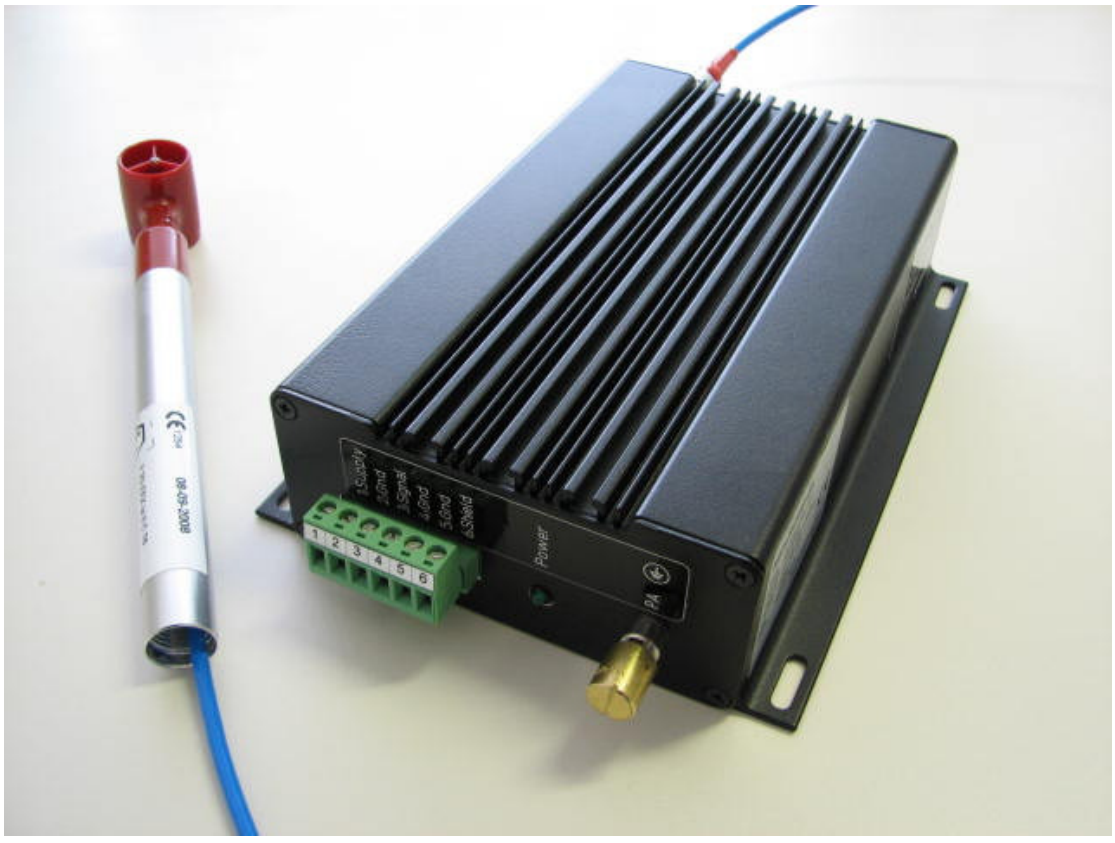
Operating Manual Extension for

Vane Anemometer MiniAir6/60/64-Ex

Article no.:	93.xxxx	
Type:	g.641.6xs-yyy	Micro
	g.642.6xs-yyy	Mini
	g.648.6xs-yyy	Macro
	Ex II (1/2) G [Ex ia] IIC	
Issue date:	June 2008	

For Sensor and	Article-no: 93.	Type: Micro ❒	Mini ❒	Macro ❒
Electronics:	Serial-no:	Type: MiniAir:	-Ex, Range:	m/s



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Revision history:

Date	Doc Ver.	HW Ver.	Reason for revision
30.06.2008	1.0	2.0	New issue
27.08.2008	1.1	2.0	Minor text and format changes
29.08.2008	1.2	2.0	Certificates attached, minor text improvements
01.09.2008	1.3	2.0	Measures, weights, IP-protection attached

1. Introduction

Dear Customer

Thank you for trusting in our products. This Instrument has been produced, calibrated, inspected and packed using our high quality standards based on ISO 9001:2000, EN 13980 (ATEX) and ISO/IEC 17025 (SCS 046, Airflow).

The MiniAir6x-Ex is an instrument certified for use in different zones according to the 2 certificates, attached at the end of this manual extension - one for the Sensor (for use in zone 1) and one for the electronics (for use strictly outside of any hazardous zone). The certificates are integral parts of this manual extension and its contents will have absolute priority in case of discrepancies between manual extension and certificates.

This User Manual Extension and the certificates are extensions to the standard Operating Instructions for "MiniAir6", "MiniAir60" and "MiniAir64" products. The instructions, maximum ratings and technical data in the different delivered documents, must be read and/or understood in the following ranking:

- Priority 1: All certificates
- Priority 2: This manual extension
- Priority 3: The standard Operating Instruction

Therefore, to maintain the perfect condition of the Schiltknecht Messtechnik AG (SMAG) instrument (sensor(s), electronics and optional parts) and to guarantee an error-free function, application and operating safety, we strongly recommend to read carefully all manuals (operating instructions), manual extensions and certificates before starting any installation and operation of this instrument. Also, please take care of the following additional important instructions.

Important notes and instructions
(please also see the "Important notes" in the standard Operating Instruction)

- The following documents should be part of the package content:
  a.) The standard "Operating Instruction" for your MiniAir6, 60 or 64
  b.) This User Manual Extension for MiniAir6x-Ex products (including all copies of certificates)
  c.) Copy of the ATEX Quality Inspection Protocol (QM form 15.02.07) for your instrument.
  d.) SM- or SCS-Calibration Certificate (if you ordered one of these options).

  Please inform your SMAG sales office or agent immediately, if you didn't receive all above listed documents.

Do not install and operate the [Ex] instrument, if you don't have at least the documents according to letter a.) to c.), listed above.

- Never install and/or operate an [Ex] certified instrument in zone 1, when it has been obviously damaged during transportation.
- Never expose the instrument in ambient conditions which are not covered by the specifications in the standard "Operating Instruction".
- A licensed and specially trained electrician is required to install [Ex] certified equipment.
- Maximum Ratings for temperature and humidity: please see standard "Operating Instructions" under title "Technical Data"
- For the guarantee provisions, please see standard "Operating Instructions" under "Guarantee".
- Other applied standards:
  - EMC
  - EN 1127-1: 2007

2. Content of Delivery

The content of delivery (each package unit) consists of the following:

1 Flow sensor MiniAir6x, Type f.6xx with assembled LEMO connector

1 Explosion protection certificate for the flow sensor MiniAir6x

1 Signal converter unit MiniAir6x-Ex, Type g.64x
- with intrinsically safe power circuit
- installed in an aluminum housing; dimensions: 130 x 175 x 45mm

1 Explosion protection certificate for the signal converter unit MiniAir6x-Ex

1 Connecting screw terminal, 6-pole, Combicon

1 Operating instructions, User Manual Extension (this document), other Certificates

3. Intended Use

This device measures the air flow in [Ex] zone 1 from 0 to 20, 40, or 80 m/s (other ranges are optional) using a sensor with an impeller, having explosion protection certification.

The signal converter (electronics) has a built-in intrinsically safe barrier. Strictly mount these electronics only outside hazardous zones.

Do not use the instrument in an application where any air velocities higher than 120% of the specified full scale must be expected.

Do not use the instrument for gases and air with a temperature higher than specified by the [Ex]-certificate and/or the "Operating Manual".

The instrument has mechanically very sensitive bearings. Also the impeller is sensitive against mechanical shocks; therefore:

- Never touch the impeller with hands or other solid parts.
- Never try to adjust yourself the manufacturer settings of the bearings.

Sensor, cable and LEMO connector are one unit specified by the [Ex]-certificate. Never do shorten or extend the cable yourself.

Never use the instrument to measure any types of liquids.

4. Method of Measurement

4.1 Flow Sensor Type f.6xx

The snap head converts the air velocity into a rotation of the impeller, whose RPM is mainly proportional to the air velocity.

Depending on the number of blades and the size of the snap head a frequency can be detected with electronic means. The frequency detecting sensor operates with a magnetic field of high frequency (>1 MHz) and is free of any reactivity to the impeller's rotational frequency. The measured frequency will be transmitted to the electronics:

MiniAir6 : having a voltage output (typ. 0*...2 volts)

MiniAir60 : having a frequency output (typ. 0...XXXX Hz**)

MiniAir64 : having a current output (typ. 4*...20 mA)

[*] plus corresponding start-up value according to the table under par. 5.2

Since flow velocities below the mechanical start-up of the impeller cannot be measured, this missing part is added to the output signal (voltage and current outputs only). Consequently there is no absolute zero output (0.0 volts or 4.00 mA), even if the air velocity is zero or below the impeller's start-up value (the impeller is at a standstill).

[**] Typical frequencies [Hz @ 15 m/s] for different snap heads and its full scale ranges:

Full scale ranges:	20m/s	40m/s	80m/s
Micro snap head:	2180	1070	515
Mini snap head:	1336	666	334
Macro snap head:	710	355	NA

Micro

Mini

Macro

4.2 Power Supply / Transmitter, Type g.64x.

This unit contains the sensor power supply and signal converter electronics for the velocity measurement. The analyzing unit converts the input signal from the sensor into a frequency, voltage, or current according to the measuring range of the sensor.

The intrinsically safe power circuit limits the voltage and current to values at which the sensors with the same values can be used in the intrinsically safe type of protection in explosive atmospheres.

Type designation of the possible variants:

MiniAir6	g.64x.6s-yyy	Voltage output signal
MiniAir60	g.64x.60s-yyy	Frequency output signal
MiniAir64	g.64x.64s-yyy	Current output signal

The full scale value of the analogue output signal for the current or voltage output is always the same for all impeller sizes and measuring ranges. The frequency output varies for all types. The output signals can also be customised to have other values (like 0-20mA, 0-5Vdc, or 0-10Vdc).

5. Technical Data

5.1 Power Supply and Transmitter

Art. No.:		**93.xxxx**
Type:	Micro:	**g.641.6xs-yyy**
	Mini:	**g.642.6xs-yyy**
	Macro:	**g.648.6xs-yyy**
Type of explosion protection:		⟨Ex⟩ II (1/2) G [Ex ia] IIC
Serial No. (SN):		(please see first page)
Power supply:	Voltage output:	+9.0 to 24 V_{DC}, smoothed (Um=250V)
	Current output:	+9.0 to 24 V_{DC}, smoothed (Um=250V)
	Frequency output:	+5.0 to 24 V_{DC}, smoothed (Um=250V)
Current consumption:		
	Voltage output:	approx. 15 mA
	Current output:	approx. 35 mA
	Frequency output:	approx. 15 mA (approx. 10 mA for front LED included)

5.2 Flow Measurement

Standard measuring ranges (optional: others on special request):

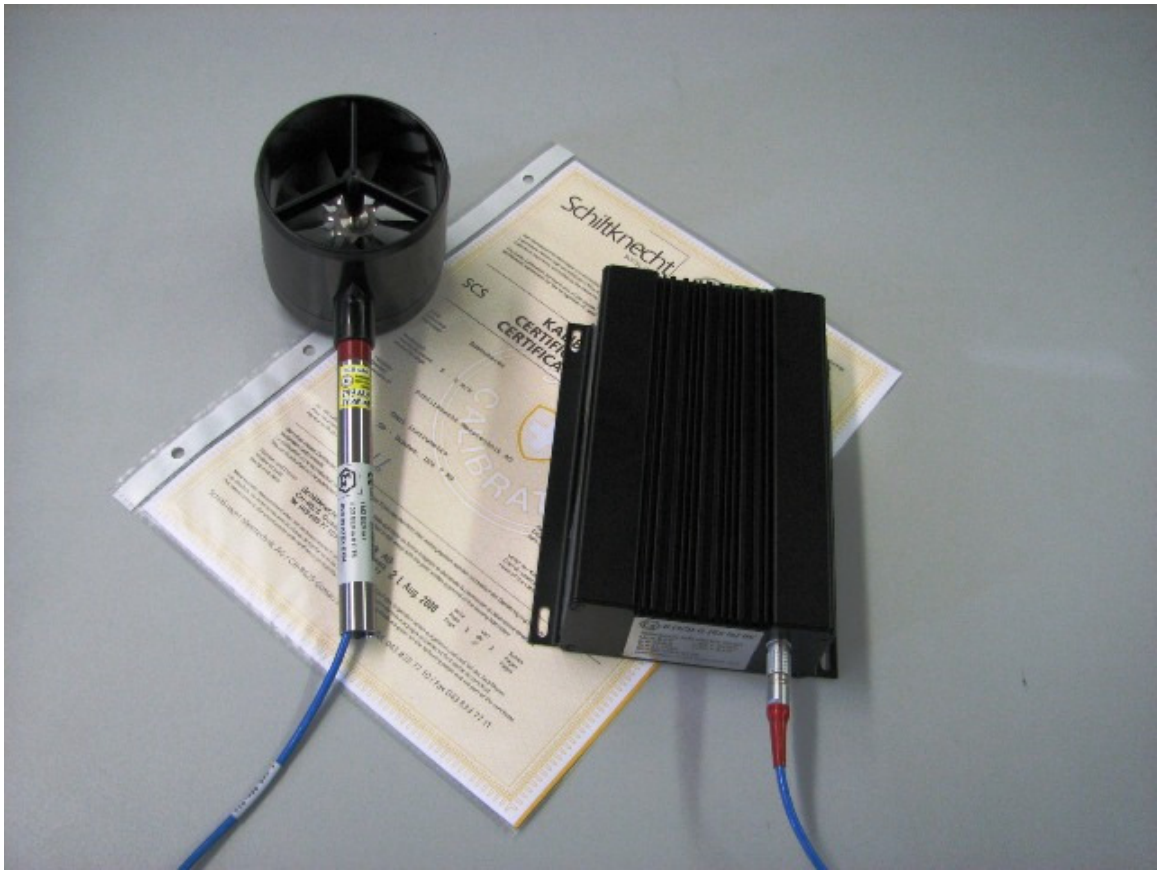
	Micro:	0.6 to 20 m/s 0.8 to 40 m/s 1.0 to 80 m/s
	Mini:	0.4 to 20 m/s 0.6 to 40 m/s 0.8 to 80 m/s
	Macro:	0.2 to 20 m/s 0.4 to 40 m/s NA
Output signal:	Current (MiniAir64-Ex):	4.00 (+ start-up value) to 20 mA Load resistor: <= 500 Ohm
	Voltage (MiniAir6-Ex):	0.0 (+ start-up value) to 2.0 V_{DC}
	Frequency (MiniAir60-Ex):	0.0 to xx Hz (according to vane and measuring range)

5.3 Intrinsically Safe Power Circuit

Type:	9001/01-086-010-101
U_0:	8.6 V
I_0:	10 mA
P_0:	21.5 mW
L_0/IIC	300 mH
C_0/IIC:	6.2 µF
R_S:	899 Ohm
Fuse:	160 mA, medium-lag

5.4 Calibration certificates

Optional and on demand Certificates of calibration according to ISO/IEC 17025 (SCS 046, Airflow) are available for MiniAir6-Ex, 60-Ex or 64-Ex instruments.



6. Plug Assignment

6.1 Sensor Port (Input/Output)

LEMO socket, Pin assignment:

Pin 1:	NC (not used)
Pin 2:	GND
Pin 3:	Sensor signal
Plug housing:	Screen

Important: The input/output sensor is conducted through an intrinsically safe power circuit -> see 5.3.

On one hand Pin 3 is used to supply intrinsically safe the sensor. On the other hand the sensor is modulating the current consumption at Pin 3 with the frequency generated by the impeller's rotation speed.

This is valid for all types of sensors. The conversion into a voltage-, TTL- or current-signal will be carried out in the MiniAir transmitter.

6.2 Power Supply and Signal Output (Input/Output)

Combicon screw terminal (see picture below)

Terminal 1:	Power supply **+** [U^+]
Terminal 2:	Power supply **–** [GND]
Terminal 3:	Flow-signal
Terminal 4:	Flow-signal [GND]
Terminal 5:	GND
Terminal 6:	Shield

Note to terminal 3: Depending on the type MiniAir (6, 60 or 64) terminal 3 has a voltage, frequency or current output.

6.3 Potential Equalisation Port

Screw terminal (see picture below)

Terminal PA:	Potential equalization

7. Measures, weights and IP-protection

Power supply and Transmitter

Weight:	600 gr.
Measures:	130 x 175 x 45 mm (LxWxH)
IP-protection:	IP 40

8. Assembly

The device can be attached using the four boreholes in the corners of the housing. The sensor is inserted into the 3-pole LEMO socket. The power supply and signal output are connected to the screw terminal. During installation and operation, the potential equalisation terminal must be connected to earth with at least $4mm^2$. The device may be used only outside of potentially explosive atmospheres.

9. Operation and Maintenance

After the connection of the ports described above, the device is immediately ready for operation. A green LED signalises the state "ready for operation".

Please also refer to the standard "Operating Instruction"

Please note: This device is a precision measurement device and should be handled accordingly.

10. Warranty

For warranty information please refer to the standard "Operating Instruction".

11. Certificates

11.1 SEV 08 ATEX 0135

For power supply and transmitter (2 pages)

electrosuisse

(1) **Conformity Statement**

(2) Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC

(3) Test Certificate Number

SEV 08 ATEX 0135

(4) Equipment: Supply and analyzing unit "MiniAir6x-Ex" type g.64x.6x-yyy

(5) Manufacturer: Schiltknecht Messtechnik AG

(6) Address: Industriestrasse 13, CH-8625 Gossau ZH

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) Electrosuisse SEV certifies that this equipment has been found to comply with the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The results of the examination are recorded in confidential report No. 08-IK-0184.01

(9) Compliance with the essential health and safety requirements has been assured by compliance with:

EN 1127-1:2007

Note:
Further harmonized EN standards are used in the separate conformity assessment procedures of the integrated components.

(10) If the sign «X» is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This Conformity Statement relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this directive apply to the manufacture and the placing on the market of this equipment.

(12) The marking of the equipment shall include the following:

Ex II (1/2)G [Ex ia] IIC

Electrosuisse SEV
Certification Body ATEX

Fehraltorf, 2008-07-29

Erich Obrist
Product Certification

Page 1/2

SEV Verband für Elektro-, Energie- und Informationstechnik
SEV Association pour électrotechnique, les technologies de l'énergie et de l'information
SEV Associazione per elettrotecnica, la tecnica energetica e l'informatica
SEV Association for Electrical Engineering, Power and Information Technologies

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electrosuisse

(13) # Appendix

(14) **Conformity Statement SEV 08 ATEX 0135**

(15) Description of the equipment

The supply and analyzing unit "MiniAir6x-Ex" type g.64x.6x-yyy contains the sensor supply and signal converter electronics for speed and flow measurement from an impeller sensor. The analyzing unit converts the signal, corresponding to the sensor measuring range, into a frequency, voltage or current measuring range.

The supply and analyzing unit "MiniAir6x-Ex" type g.64x.6x-yyy is installed outside hazardous areas.

Ratings

Output, supply and measuring circuit	With type of protection intrinsic safety Ex ia IIC

Maximum values:

$U_o \leq 8{,}6$ V
$I_o \leq 10{,}0$ mA
$P_o \leq 21{,}5$ mW

$C_o \leq 6{,}2$ µF (max. permissible external capacitance)
$L_o \leq 300{,}0$ mH (max. permissible external inductance)

Notes

1. According to Directive 94/9/EC (ATEX 95), Appendix I, the supply and analyzing unit "MiniAir6x-Ex" type g.64x.6x-yyy is a component of the equipment group II, category (1/2) G, which according to Directive 99/92/EC (ATEX 137) may only be used outside hazardous areas.

   For use/installation, the requirements of EN 60079-14 must be observed.

2. The permissible ambient temperature range is -20°C to +40°C.

(16) Test report 08-IK-0184.01

(17) Special conditions for safe use
None

(18) Fundamental essential health and safety requirements
Fulfilled by the standards applied.

Electrosuisse SEV
Certification Body ATEX

Fehraltorf, 2008-07-29

Erich Obrist
Product Certification

SEV Verband für Elektro-, Energie- und Informationstechnik
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11.2 BVS 04 ATEX E 194

For air flow sensor type f.6** (2 pages)

EXAM
BBG Prüf- und Zertifizier GmbH

Translation

(1) **EC-Type Examination Certificate**

(2) **- Directive 94/9/EC -**
Equipment and protective systems intended for use in potentially explosive atmospheres

(3) **BVS 04 ATEX E 194**

(4) **Equipment:** **Strömungssensor type f.6** and f.72***

(5) **Manufacturer:** **Schiltknecht Meßtechnik AG**

(6) **Address:** **CH - 8625 Gossau ZH**

(7) The design and construction of this equipment and any acceptable variation thereto are specified in the schedule to this type examination certificate.

(8) The certification body of EXAM BBG Prüf- und Zertifizier GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
The examination and test results are recorded in the test and assessment report BVS PP 04.2132 EG.

(9) The Essential Health and Safety Requirements are assured by compliance with:

EN 50014:1997+A1-A2	General requirements
EN 50020:2002	Intrinsic safety "i"

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC.
Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 2G EEx ia IIC T6
I M2 EEx ia I

EXAM BBG Prüf- und Zertifizier GmbH
Bochum, dated 30. August 2004

Signed: Migenda — Certification body

Signed: Dr. Eickhoff — Special services

This certificate may only be reproduced in its entirety and without change
Dinnendahlstrasse 9 44809 Bochum Germany Phone +49 201 172-3947 Fax +49 201 172-3948
(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany)

EXAM
BBG Prüf- und Zertifizier GmbH

(13) Appendix to

(14) # EC-Type Examination Certificate

BVS 04 ATEX E 194

(15) 15.1 Subject and type

Flow sensor type f.6** and f.72*

15.2 Description

Flow sensors type f.6** measure the flow rate of air or liquids. The rotation of a impeller, driven by the flow, is measured. A nearly completely potted electronic board transforms the value if the rotation into an electric signal. A temperature sensitive resistor is also mounted.

The temperature sensors type f.72* have temperature sensitive resistors in different sensor heads.

15.3 Parameters

15.3.1 Electrical data at the 5-pin plug with reference to pin 5 (ground)

Nominal ratings

Nominal voltage	U_N	DC	5 - 15	V
Nominal current	I_N		1	mA

safety related maximum values

voltage	U_i	DC	18	V
current (sum)	I_i	DC	10	mA
power (sum)	P_i		110	mW

(16) Test and assessment report
BVS PP 04.2132 EG as of 30. August 2004

(17) Special conditions for safe use
none

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, 30. August 2004
BVS-Ad/Kw A 20030760

EXAM BBG Prüf- und Zertifizier GmbH

Certification body | Special services

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